above formula all antipyretics, for the mode in which these agents depress temperature varies greatly.

The lowering of the temperature caused by the maintenance of an immobile condition of the body is overcome by artificial heating. For the purpose of this inquiry I employed a hot-air chamber, large enough to contain the rabbit support and an apparatus for maintaining a uniform heat. The temperature of the chamber was registered by a thermometer projecting into the interior, the scale being external. The results were so uniform that I need not now occupy space in detailing the individual observations. The experiments as narrated above were first made, and then without delay the rabbits were placed in the hot-air chamber, the thermometer *in situ*. The temperature of the hot-air chamber was usually 130°. Several observations were made with the air of the chamber at 160°. The rise of temperature which followed the introduction of the animal into the hot air was more rapid when the temperature of the hot-air chamber was at the maximum. The results of heating were constant, and I state the averages:—

In fifteen minutes the temperature rose . . .	0°5
In thirty minutes " " " . . .	2°
In one hour " " " . . .	3°.5
In two hours " " " . . .	1° to 2°

above normal.

The same results were obtained when the temperature had been reduced by the antipyretics, as detailed above. When the temperature had, by artificial heating, been raised to normal, it declined again when the rabbit was placed, still in the support, in the external air.

120 WEST SEVENTH STREET, CINCINNATI, O.

ART. III.—*The Treatment of Certain Injuries of the Head, accompanied by Lesions of the Brain and its Membranes.* With illustrative cases. By W. B. RODMAN, M.D., of Frankfort, Ky.

SINCE surgery has been an art, its authors, teachers, and practitioners have differed widely in their views of the proper treatment for the various wounds of the skull. The subject of simple fracture with depression (with or without symptoms of compression of the brain) has been an especial ground of contention. I believe that most surgeons are agreed on the treatment of compound fracture of the skull with depression, but very few of them dare to treat a simple fracture as they would a compound one. They fear that hemorrhage, inflammation, erysipelas, and encephalitis in its various forms, will supervene if an incision is made when the fracture is simple. My object in writing this paper is to show that these dangers are more *traditional* than *real;* that more lives have been sacrificed and minds left permanently impaired from fear of making an incision, so that the actual condition of the bone might be thoroughly known and thereby remedied, than have been lost from an opposite course of treatment; that even conservative, or rather *non-operative* surgery may be carried to an extreme; that the danger of making a compound out of a simple fracture has been greatly overrated by the older writers, and that we of the present day have blindly accepted their views as infallibly correct.

No doubt that Cooper, Abernethy, Dupuytren, and others wrote as their reasoning from observation of cases prompted them. They saw compound fractures of the skull and those simple fractures made compound by the surgeon do badly.

These men treated all injuries of the head when brain trouble existed, or was apprehended, by general bleeding, comparative starvation, tartar emetic, and calomel. Under this plan, even the simplest wound of the scalp would be predisposed to slough, to take on a low grade of inflammation, or be attacked by erysipelas. Let us see for one moment if these dangers are common under a more rational treatment. I grant that bruised, lacerated, or punctured wounds of the scalp will take on just such action as wounds of the same character in other parts of the body. But are these the wounds a surgeon would make in incising the scalp in his endeavour to learn the exact condition of the broken bone beneath? What is the usual consequence of an incised wound of the scalp? Union by first intention if properly treated.

On page 15, Part 1st, *Surgical History of the War of the Rebellion,* this language will be found:—

> "Of the two hundred and eighty-two cases of incised wounds of the scalp above recorded, six terminated fatally. . . . . An examination of the record in each individual case indicates . . . . that three died from some form of encephalitis, directly resulting from the injuries received."

As others were discharged for mental aberration, vertigo, imperfect vision, headache, persistent pain at the seat of injury, it is reasonable to suppose that in these cases there was something more than a simple incised wound of the scalp; in other words, that the three who died, and those who suffered, as mentioned above, had their *skulls fractured* by the sabre, which inflicted the incised scalp wounds. The three other deaths are recorded as having occurred from causes totally independent of the wounds received. This statement does not show that an incised scalp wound is such a dreadful affair.[1]

---

[1] The case of Harrison G. Campbell (page 4) will appear remarkable to those who so firmly believe that scalp wounds are particularly liable to erysipelas. This man had a scalp wound. Erysipelas attacked the left leg (upon which there was no wound), and from this part extended to his body, other leg, throat, and face. He died without the scalp wound ever having become erysipelatous.

It may be said that an incised wound of the scalp, without a fractured skull, is a very simple affair; but that when it accompanies or complicates a fractured skull it renders the latter more dangerous. How so? Is there any special danger in the scalp wound *per se*? Is there here any hidden source from which innumerable agents may spring, bringing in their train erysipelas, inflammation, abscess or hernia of the brain? I contend that an incised wound made by the surgeon for the purpose of ascertaining the exact condition of a fractured skull is harmless. If the fracture is not extensive, or depressed enough to require trephining, or raising, or removing the fractured bone, the simple incision can do no harm. If the reverse be the case, I pity the patient who falls under the care of the surgeon too timid, too faint-hearted to make the necessary incision, even if he renders a simple a compound fracture.

It is proper at this point to discuss the opinions and teachings of Gross and Erichsen (who have probably more influence over the practice of surgery in America than any other writers or teachers).

Gross (*Syst. Surgery*, 1872, vol. ii. p. 133–4), speaking of the treatment of compression of the brain by depressed bone, says:—

> "When compression is produced by depression of bone, attended with compound fracture, immediate recourse should be had to trephining. . . . . The question is still an open one as it respects the treatment of compression from depression attended with simple fracture. . . . . I am disposed to regard operative interference as justifiable only in the event of extensive depression, and I should adopt this plan whether the symptoms of compression were urgent or not, on the ground that the patient would be much less likely to suffer from subsequent cerebral disorder."

Page 146, under the head of Simple Fracture with Depression and Symptoms of Compression, he says, speaking of delay and immediate operative interference :—

> "Unfortunately experience, always the best guide in such matters, has not fully decided the question as to which of these two plans should be preferred. . . . . But I am decidedly in favour of immediate trephining, on the ground that while the *operation adds but little to the risk*[1] of the case, the patient has a much better chance of prompt recovery. As long as the bone is depressed, even supposing that the compression is removed, there is danger of inflammation of the brain and its envelopes, to say nothing of the occurrence of epilepsy and other nervous affections. . . . . My opinion then is, that operative interference, early and efficient, is, as a rule, the only proper plan to be pursued under such circumstances."

If Prof. Gross intends to convey the idea that he would *not* operate when he says, as above quoted, "I am disposed to regard operative interference as justifiable only in the event of extensive depression, and I should adopt this plan, whether the symptoms of compression were urgent or not," etc., there is a decided conflict in his opinions. The sentence is, at least, ambiguous.

---

[1] The italics are mine.

Page 146, 1st line, speaking of simple fracture with depression of bone (without symptoms of compression), he says:—

> "Upon this subject (treatment) surgeons have been divided in opinion, some favouring, others condemning operative interference; favouring, because of the dreaded primary and secondary effects; condemning, because a simple fracture is thus converted into a compound one."

Dr. Gross would here be guided by the degree of depression; if slight, would not interfere; if very decided, he would. He closes this paragraph with these remarks:—

> "A man labouring under such an affection [depressed bone] is never free from danger; he may get well, or be well to all appearance, and yet be only partially cured, subject, at any moment, to have his life and mind imperilled by the broken bone. It is like the sword of the tyrant suspended over the head of his subject."

What is the treatment almost universally recommended in compound fracture with depression of bone, with or without symptoms of compression? To relieve the depression at once by trephining, if this be necessary, but at any hazard to elevate or remove all depressed bone. Yet if depression occur in a simple fracture, it must be let alone, unless it is evident that the patient will die, and that soon! It is asking too great a risk of the surgeon to make a simple incision down to the fractured bone, and see the exact condition of it; for, by so doing, he is making a compound fracture out of a simple one, and there is danger of inflammation!

It took the profession nearly one hundred years to learn that hot drinks and starvation would not cure a fever patient. How long will it take them to find out that a simple fracture of the skull should be treated as a compound one; and that a depression of bone under a scalp intact, is as dangerous, if let alone, as the same amount of depression under a cut six inches long?

The special dangers of compound fracture are said to be shock, inflammation, and fungus of the brain. Probably if an even number of fractures, both simple and compound, were analyzed, shock would be found to predominate in the latter; not because they are compound merely, but because there would be naturally in compound wounds more injury to the skull bones independent of the scalp wound. The compound fractures of the skull are, in civil practice, rarely accompanied by clean incised wounds, but the scalp wound is generally lacerated, bruised, or punctured. This class of wounds almost invariably suppurate, and thereby they might, to a slight extent, prejudice the chances of recovery by interfering with the brain. But a simple incised wound should heal by first intention, and in no wise interfere with the perfect recovery of the brain and its membranes. Will any one contend that a simple incised wound is, in itself, the least responsible for fungus cerebri? Unless there is decided depression of bone and some laceration of dura mater, fungus will hardly occur. In the event that there is sufficient depression of bone and laceration of dura mater, to let the brain escape beneath the scalp, I venture to say that death is inevitable, unless the bone is raised; and this cannot be done without an incision, which makes a compound out of a simple fracture. I think it would do well to put these imaginary horrors of compound fracture along with that which the laity so much dread, viz., "taking cold in the cut."

Erichsen, Philadelphia, 1869, page 347, says:—

"If there be no wound in the scalp, but the occurrence of symptoms of compression and the existence of some irregularity of the skull at the seat of injury lead the surgeon to suspect a depressed fracture, he should make a crucial or T-shaped incision down upon the part in order to examine the bone, and if this be found depressed to elevate or remove it."

Page 348, fourth line: "In those rare cases in which there is depressed fracture without symptoms of compression or even a wound of the scalp, the line of practice is still unsettled as to whether the depressed portion of bone should be left where it is, or an attempt be made to elevate it."

Erichsen, in these last-mentioned cases, seems biassed by the opinions of Cooper, Abernethy, and Dupuytren, who adopt the expectant plan, but he does not adhere strictly to their advice, but remarks further on: "I think, however, this expectant practice should not be followed too implicitly, but that we must be guided by the circumstances of the particular case." I would say in all cases of doubt as to whether there was depressed bone or not, make an incision—it can do no harm—having done this, treat the fracture as you would a compound one—there is no doubt about the treatment then, because all are agreed on immediate interference in compound fractures. I know, or at least have reason to believe, that persons (especially children) have fully recovered without depressed bone being raised; but this result is an exception to a very general rule. In adults it occurs but very rarely.

Although my experience is rather limited, I will relate a series of cases which have made an indelible impression on my mind, and have strengthened my convictions as to the proper treatment of skull fractures:—

CASE I.—John Newman, age 16, was thrown from a horse on April 22d, 1876. Falling, he struck violently upon the left side of his head on a round stone in the bed of a branch. This was four miles from Frankfort. I saw him at 9 A. M., one hour and a half after the accident. He had symptoms of concussion of the brain, would answer when spoken to, and several times, with assistance, arose from a lounge and walked across the room to a fireplace and vomited. When asked what hurt him, he said his head, and would put his hand over the injured part. I found a great puffy tumour of the scalp, almost as large as one's hand, extending from the left ear to within a short distance of the sagittal suture, and almost as broad as long. *There was no wound* of the scalp. The scalp tumour was puffy, yet firm; so much so that I was unable to feel whether the skull bone was broken and depressed. From his condition I concluded that he could be carried to his own home, two miles nearer town, and I directed that this should be done on a litter. In the mean time I returned to town for instruments and assistance. When I reached him the second time I found that he had been brought the distance of two miles in a buggy, and not on a litter as I had directed. He had, however, rallied so much from the concussion that he was able to talk, and to hold a conversation with the priest during the rite of extreme unction.

Notwithstanding this was a simple fracture with no symptoms of compression, and although I was unable after careful manipulation to detect any fracture, I determined to cut down upon the bone at once. Chloroform having been sparingly administered, I made an incision extending from the ear to within two inches of the sagittal suture. When this incision was carried to the bone, or rather where the bone had been, there was such a terrific gush or spurt of blood and *brain* that I thought the boy would die then and there. I thought that the middle meningeal artery or the lateral sinus, or both, had been ruptured. (A fissure in the bone ran across the course of the lateral sinus, and a large branch of the meningeal artery was ruptured.) Having made a T-shaped incision and reflected the scalp, an enormous fracture came into view. Two pieces of broken bone, each as large as the bowl of a teaspoon, were projecting perpendicularly into the brain from the anterior edge of the fracture. They had lacerated the dura mater fearfully, and had crushed out nearly half an egg-shell full of brain. Several other pieces, much larger in the aggregate than the two together, mentioned above, were removed. One large piece, not being entirely detached, was raised and left. The surface thus left unprotected by bone was at least two and a half inches in diameter. Of course no trephining was necessary. The sharp points of bone being removed with the pliers, the periosteum and dura mater having been replaced as well as possible, I closed the incisions with sutures except enough immediately over the ear for the purpose of drainage. The wound was then dressed with cold water. No ligatures for the arteries of the scalp were necessary. The boy was then left, and his father ordered to give him 20 grs. of potass. bromid. every two hours if he should become restless or complain of headache. He did well for ten days, having suffered slightly with symptoms of cerebral irritation, which were easily controlled by the potass. bromid. There was very little purulent discharge, and this came through the upper part of the wound where the sutures were, the lower part, without sutures, having healed by first intention in two days. There was up to this time every indication of a favourable result.

May 1st, I for the first time noticed indications of fungus of the brain. The sutures had been pulled loose and the incisions made to gape by an ugly pulsating tumour forcing its way through the wounded scalp. (The incision into the scalp indirectly caused the fungus—for if the incision had not been made the boy would have died before the fungus could have formed!) When I attempted to use compresses they gave such pain that I had to abandon them. The wound was syringed out with a carbolized solution, and in two or three days (during which time there were symptoms of decided cerebral irritation) the compresses were again applied, and this time could be borne. The fungous tumour, the size of a pullet's egg, decreased, the wound in the scalp rapidly cicatrized, and the boy is now entirely well. During the latter part of June, contrary to my advice, he passed a very creditable final examination in his school. His mind is as clear as ever.

This case is a remarkable instance of decided depression of bone and extravasation of blood without a single symptom of compression. It also illustrates to what a fearful extent bone may be broken, dura mater lacerated, and brain literally crushed, without the scalp being in the least wounded. I will state here that I could easily feel the petrous portion of the temporal bone when I was exploring the wound for loose fragments from the fracture.

Does any one pretend to say that I did wrong in operating so soon on this boy? Should I have waited until symptoms of compression came on before making the exploratory incision—for such it was in the beginning? But for the course pursued death would in all probability have resulted. Yet this case was treated contrary to the rules laid down in the text-books. It was a simple fracture, without apparent depression, and with no symptoms of compression.

CASE II.—Lee Frazier, age 13, was struck over the left temple by the butt-end of a base-ball bat on the afternoon of Sept. 16, 1870. He was brought to my office, a distance of two blocks from where he was injured, and I saw him a few minutes after the occurrence. Symptoms of concussion predominated over those of compression, which latter were very slight. There was a cup-shaped depression on the left side of the head just the size of the end of the bat with which he had been struck. As the fracture was simple and the symptoms of compression but slight, it was determined to wait until the demand for operative interference should become more urgent. The next morning, instead of a depression there was a puffy scalp tumour over the seat of fracture, and the boy was comatose. I made a crucial incision large enough when the flaps were reflected to expose the whole fracture. As the bones were fearfully crushed, no trephining was necessary. I began to remove pieces of bone, and continued until I was alarmed at the tremendous gap I was making in the skull. Most of the squamous portion of the temporal, a large piece of the parietal, including the *anterior-inferior angle*, part of the frontal, and part of the great wing of the sphenoid were loose and had to be removed. Pieces which were only partially detached were raised and left. The dura mater was slightly lacerated, much less than would be expected under the circumstances. The brain did not seem to be injured at all. Sutures having been used, the wound was dressed with cold water and a compress applied. The boy became conscious soon after the operation, and made a perfect recovery without a single unfavourable symptom. I attribute the non-formation of fungus to the fact that there was but slight laceration of dura mater.

This boy should have had immediate attention, due regard being had for the shock and concussion which existed at the time. I think now that I took a great risk in allowing him to remain in his condition for fifteen hours, as he might have died during that time. In the *Am. Journ. Med. Sciences* for July, 1876, p. 292, there is the report of a case by Dr. Turner, of Dakota, which illustrates the danger of too long delay. His patient might *possibly* have been saved by proper treatment instituted soon enough; but I must confess that it would require a bold surgeon to have performed the necessary operation in view of the modern and ancient teaching on this subject. The proper treatment was decided on, viz., to make an exploratory incision and be guided by the result; but the works on surgery being rather timid in advising this course, Dr. Turner waited until death was upon his man. I venture to say that if he has another case resembling this he will make an incision at once, and if necessary trephine, elevate depressed bone, or, if extravasation of blood is supposed to be the cause of the compression, remove it at all hazards. Death is almost certain unless this plan be followed.

I might mention here a singular fact. Dupuytren was one of the strongest advocates of the expectant or let-alone treatment in simple fractures of the skull with depression. Yet, believing that a patient had an abscess of the brain, he trephined, and when even the dura mater was punctured and no pus flowed, he was bold enough to plunge his bistoury into brain substance itself and thus achieve a wonderful cure.

The following cases show the danger of the non-operative treatment:—

CASE III.—In 1869 I was sent for by the attending physician to see J—— E——, aged 8 years, in an adjoining county. The messenger, a negro, said he had been kicked in the head by a horse, but gave no further particulars. When I arrived there were five other physicians in the house. I learned that the boy had been injured *twenty-eight days* before. There was slight "concussion" at the time of the injury, but the doctor had apprehended nothing serious up to the last four or five days, when the boy began evidently to grow worse. On examining him we found a scalp wound about one and a half inch long over the right frontal eminence. This wound had healed by granulations, which then looked pale and flabby. Not one of us could tell by physical examination whether there was a fracture of the bone with depression. The attending doctor said he didn't know, as he had not examined when the wound was open, and he had seen no symptoms indicative of depressed bone. (He had probably consulted some work on conservative surgery, which told him never to interfere unless there were symptoms of compression.) The boy's pulse was over 130, his tongue coated, bowels irritable. He was partly delirious, and had decided photophobia. I expressed the opinion that there was irritation or inflammation of the brain resulting probably from depressed bone or a small abscess, and I proposed to open the wound and make the examination thorough. Only one physician agreed to my opinion; the others said that it would make matters worse by any interference. They finally consented, "as the boy would die anyhow," that I might be allowed to see the nature of the injury. (I was granted permission to make something on the order of an *ante-post-mortem examination* rather than a surgical operation.) I made a crucial incision, and removed two pieces of depressed bone half the size of the bowl of a teaspoon. The brain looked disorganized, and there was a slight sero-purulent discharge through the wound. He died two days after the operation.

I have no doubt that this patient could have been cured if the exact nature of the injury had been fully ascertained when first received, and the offending pieces of bone promptly removed. As I did not operate until the secondary effects of the injury had occurred and he was evidently doomed, it cannot be said that the operation of reopening the wound killed him.

CASE IV.—Hugh C———, aged 5 years. Some time in May, 1876, I was called to see this child, who was having severe muscular spasms, confined to the left side. He had been vomited and purged before I reached him. The warm bath and cold to the head seeming to have no effect, I used chloroform by inhalation, which stopped the spasm. Not being able to trace the convulsion to the usual causes, and observing the unilateral character, I pressed my inquiries, and learned that six weeks before he had been struck over the right frontal eminence by a piece of brick, which made a punctured wound of the scalp down to the bone. The family physician coming in, I advised that the child be given large doses of the bromid. potass., and if the spasms were not controlled by this treatment, I would certainly trephine over the wound. I told him what I supposed to be the cause of the convulsions. He agreed with my views. About two weeks after my first visit I was called again, and found the child in the same condition as when I first saw him. I learned that he had taken the remedies, but that the spasms had occurred more frequently and with greater intensity. I again suggested trephining, and the attending physician tried to persuade the parents to consent. They thought, however, that the remedy was too severe, and their child might "outgrow" his trouble. He died. I believe that there was here a fracture of the internal table of the skull, and that a splendid opportunity to save a life by trephining was lost. *No post-mortem permitted.*

CASE V.—John J———, aged 21, walked into my office as if in perfect health. When asked what brought him, he said, "Oh, nothing much. I've got a knife blade in my head; I want you to take out." A few hours before he had been stabbed through the left side of the frontal bone about a half inch from the coronal suture and an inch to the left of the median line. He said his head pained him some little, but the closest observation revealed no symptom that the man was hurt. The blade was the large one of a "Congress knife." On examination I found it broken off to the shank, and firmly fixed in the skull, only the eighth of an inch remaining above the bone. I made a crucial incision, and dissected the scalp from around the blade. In spite of all my efforts with instruments (shoemaker's pinchers and others), the blade could not be moved. I suggested trephining. My father, thinking this operation too dangerous and unnecessary, suggested that he could chisel enough of the skull away from the blade to enable us to remove it. This he proceeded at once to do; the fellow in the mean time sitting in a chair and taking the whole proceeding very quietly. The man did well for three days, and in six he was *dead.*

What killed him? The blade penetrating the brain? No; the blade had fractured the internal table, and although the chisel had removed enough to release the knife, it had not taken away a few sharp spicula of bone which were then inflicting a mortal injury on the man's brain. It may be interesting to contrast the last case with the following:—

CASE VI.—Nelson Finney, a coloured man, aged 25 years, having insulted a damsel of his persuasion at a dance, was immediately felled to the floor by a skillet, an old frying skillet, which is so common an article over our "Sunny South." The woman held it by the long handle, and struck Finney with such force as to bury one of the legs at least one and a half inches into his brain. He was struck over the left temple. The blow was received about midnight. Next morning when called to see him

I found him comatose, with a punctured fracture as described. The necessary incisions having been made, it was found impossible to remove or raise the bone without first using the trephine. This instrument was used at once; then there was no trouble in removing thirteen small pieces of bone, some the size of a finger-nail. The dura mater and brain were lacerated of course, some of the latter escaping. Notwithstanding these injuries, the man recovered without an alarming symptom.

I do not cite these last cases to prove my point with respect to the treatment of simple fracture with depression, but I go further and state, that frequently a life is sacrificed through the timidity of the physician even when operative interference is unquestionably sanctioned by the text-books. It is too often the case that the operation of trephining and the raising of depressed bone is deferred until the patient is moribund, or, as more frequently happens, is left to the expectant treatment because there are no immediate or urgent symptoms. As Chelius remarks, secondary effects come sooner or later, and it is then too late for any operation to be of service. I do not believe that one in ten will recover fully in mind and body when these secondary symptoms have supervened, no matter what treatment may be adopted. In nineteen cases of fractured skull (*Surg. Hist. of the War of the Rebellion*), when there were secondary complications, ten died, eight ended in permanent disability, and one fully recovered.

There is described in most surgical works a peculiar condition of the scalp, which, to a novice, seems a depression of bone in the centre of the scalp tumour. This depression is supposed to be caused by the driving forcibly together of the tissues of the scalp. Blood is extravasated around this point, and gives the scalp a puffy appearance, but, being unable to force itself between the tissues in the centre, these remain comparatively depressed. Whenever this condition exists, and the physician is in doubt as to its exact nature, an incision should be made down to the bone. If this be found fractured, treat as a compound fracture; if no fracture is present, no harm is done. The incision merely enables the scalp to get rid of the effused blood, and the sooner to regain its normal condition.

No rules of treatment can be laid down from the observation of a limited number of cases such as I have reported. I have given only a part of those which have come under my observation, having selected those which seem to me illustrative of the opinions I have advanced.

However, as experience is said to be a safe guide, let us analyze 105 cases of fractured skull reported on pages 67, 68, and 69 of *Surg. Hist. of the War of the Rebellion*, 1st Part. These fractures resembled those seen in private practice, and resulted from falls, railway accidents, blows with bludgeons and the butts of muskets, etc. 79 were treated without operative interference; 43 died, 54.4 per cent. 26 were operated on; 14 died, 60.8 per cent. This comparative mortality looks at first glace as if the views of Cooper, Abernethy, and other advocates of the non-operative plan, were correct, but a careful analysis will show the reverse of this. Of the 79 who were not operated on, 28 had fracture without injury to the brain or its membranes, and all of these latter are reported as having recovered except one, who died from laceration of the testes. These men of course required no operative treatment. There were therefore 51 who had injury to the brain or its membranes from fracture of the skull who received no operative treatment, and 43 died, a per cent. of 84.3. Of the 26 who received operative treatment 14 died, 60.8 per cent. With the fact that those operated on were probably much more seriously injured than those not, the difference in favour of the operative treatment becomes the more evident. To sum up, out of 51 men with injury to the brain and its membranes treated expectantly, 43 die, 8 recover, whether fully or not is not stated. Out of 26 men who received operative treatment (and who were probably much more seriously injured) 14 die, 9 certainly recover, and 3 probably recover. Non-operative treatment 84.3 per cent. die; operative 60.8. These facts speak out unmistakably. Of 58 cases in which compression of the brain supervened immediately or soon after the injury 46 died, 3 unknown, 3 completely recovered, 6 partially recovered. As only 14 of those operated on died, it follows that 32 men who had compression of the brain died without operative interference.

I repeat that persons, even adults, may recover from depressed bone without an operation to relieve them, but the instances on record are so rare, and they are such remarkable exceptions to the general rule, that they by no means warrant us in waiting for urgent symptoms before exploring by incision or even operating.

I cannot understand why a simple fracture should not be treated as a compound one. When there is the slightest doubt as to the nature and extent of the injury, let us imitate the example of the law, "give our patient the benefit of the doubt," by incising at once; after this has been done, treat the fracture (if there be one) as a compound fracture is treated by almost all surgeons. I suggest, however, that no *more* be done after incision in simple fracture than is recommended for a fracture compound from the beginning.

I did not, neither do I now, intend to discuss the subject of trephining, but I cannot refrain from expressing the opinion that the rules for trephining laid down by Chelius (*Syst. Surgery by South*, vol. i. pp. 456 and 457, ed. 1847) are correct and safe. The following sentence is very expressive: "Trepanning is not to be considered in itself a dangerous operation, it is so esteemed because most commonly it is employed when the diseased changes have already become great, or severe injury has been produced by external violence."